

CHAPTER XXVIII

ARABIC OCCULT SCIENCE OF THE NINTH CENTURY

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IN this chapter we shall consider a number of learned men who wrote in Arabic or other oriental languages in the ninth and early tenth century: Alkindi, Albumasar, Costa ben Luca, Thebit ben Corat, and Rasis—to mention for the present only the brief and convenient form of their names by which they were commonly designated in medieval Latin learning. Not all of these men were Mohammedans; not one was an Arab, strictly speaking; but they lived under Mohammedan rule and wrote in Arabic. We shall note especially those of their works which deal with occult science and which were plainly influential upon the later medieval Latin learning. Indeed, most of the works of which we shall treat seem to be extant only in Latin translation. This

Plan
of the
chapter.

chapter aims at no exhaustive treatment of Arabic science and magic in the ninth century, but merely, by presenting a few prominent examples, to give some idea of it and of its influence upon the middle ages. In subsequent chapters we shall have occasion to mention many other such medieval translations from Arabic and other oriental languages.

Works of
Alkindi.

One of the great names in the history of Arabic learning is that of Alkindi (Ya'kûb ibn Ishâk ibn Sabbâh al-Kindî), who died about 850 or 873 A. D.¹ Comparatively few of his writings have come to us, however, although some two hundred titles prove that he covered the whole field of knowledge in his own day. He translated the works of Aristotle and other Greeks into Arabic, and wrote upon philosophy, politics, mathematics, medicine, music, astronomy, and astrology, discriminating little between science and superstition in his enthusiasm for extensive knowledge. The first treatise of his to appear in print was an astrological one on weather prediction in Latin translation.² In 1875 Loth printed an Arabic text of his treatise on the theory of conjunctions. More recently Nagy has edited Latin versions of some of his philosophical opuscula, and Björnbo has published an optical treatise by him entitled *De spectaculis*.

*On Stellar
Rays, or
The Theory
of the
Magic Art.*

In a manuscript of the closing fourteenth century are contained several sets of errors of Aristotle and various Arabs, also others condemned at Paris in 1348 and 1363, at Oxford in 1376, and so on. Among these are listed the

¹ G. Flügel, *Alkindi, genannt der Philosoph der Araber, ein Vorbild seiner Zeit*, Leipzig, 1857.

F. Dieterici, *Die Naturanschauung und Naturphilosophie der Araber im zehnten Jahrhundert*, Berlin, 1861.

O. Loth, *Al-Kindi als Astrolog*. in *Morgenländische Forschungen. Festschrift für Fleischer*, Leipzig, 1875, pp. 263-309.

A. Nagy, *Die philosophischen Abhandlungen des Al-Kindis*, 1897 in *Beiträge z. Gesch. d. Philos. d. Mittelalt.*, II, 5.

A. A. Björnbo and S. Vogl, *Al-*

kindi, Tideus, und Pseudo-Euclid. Drei Optische Werke, Leipzig, 1911, in *Abhandl. z. Gesch. d. Math. Wiss.*, XXVI, 3.

For further bibliography see the last-named work and Steinschneider (1905) 23-4, 47, (1906) 31-33.

The Apology of Al Kindy (Sir Wm. Muir, London, 1882) is a defense of Christianity by another writer of about the same time.

² *Astrorum iudicis Alkindi, Gaspar de pluviis imbribus et ventis ac aeris mutatione, ex officina Petri Liechtenstein: Venetiis, 1507.*

*Errors of Alkindi in the Magic Art.*¹ The allusion is to a treatise by Alkindi, variously styled *The Theory of the Magic Art* or *On Stellar Rays*, which is found in Latin version in a number of medieval manuscripts,² but which has never been published or described at all fully.

Alkindi begins the treatise by asserting the astrological doctrine of radiation of occult influence from the stars. The diversity of objects in nature depends upon two things, the diversity of matter and the varying influence exerted by the rays from the stars. Each star has its own peculiar force and certain objects are especially under its influence, while the movement of the stars to new positions and "the collision of their rays" produce such an infinite variety of combinations that no two things in this world are ever found alike in all respects. The stars, however, are not

Radiation
of occult
force
from the
stars.

¹ Ampron. Quarto 151, fols. 17-19.

² In the 1412 catalogue of Ampronius, Math. 48 was "Theorica Alkindi de radiis stellicis seu arctium magicarum vel de phisicis ligaturis"; and at present Ampron. Quarto 349, 14th century, fols. 47v, 65v, 66r-v, 16r-v, 29r, contains "Liber Alkindi de radiis Omnes homines qui sensibilia / Explicit theorica artis magis (sic). Explicit Alkindi de radiis stellicis."

Harleian 13, 13th century, given by John of London to St. Augustine's Abbey, Canterbury (#1166, James, 330-1), fols. 166-74, "de radiis stellicis Omnes homines qui sensibilia / explicit Theoria Artis Magice Alkindi."

Digby 91, 16th century, fols. 66-80, Alkindus de radiis stellarum, "Omnes homines qui sensibilia sensu percipiunt. . . ."

Digby 183, end 14th century, fols. 38-45.

Selden supra 76 (Bernard 3464), fols. 47r-60v, "Incipit theoreita artium magicarum. Capitulum de origine scientie. Omnes homines qui sensibilia sensu percipiunt. . . ."; Selden 3467, #4.

Canon. Misc. 370, fols. 240-59,

"Explicit theoria magice artis sive libellus Alkindi de radiis stellatis anno per me Theod. scriptus Domini 1484. . . ."

Rawlinson C-117, 15th century (according to Macray, but since the MS once belonged to John of London it is more likely to be 13th century), fols. 157-69, "Incipit theoria Alkindi et est de causis reddendis circa operationes karakterum et conjurations et suffumigationes et ceteris huiusmodi quae pertinent ad artem magicam. 'Omnes homines qui sensibilia. . . .'"

BN nouv. acq. 616, 1442 A.D., Liber Jacobi Alchindi de radiis.

CU Trinity 936 (R. 15, 17) 17th century, Alkyndus de Radiis.

Ste. Geneviève 2240, 17th century, fol. 32 (?)—since the treatise is listed between two others which begin at fols. 68 and 112, respectively — "Alkyndus de radiis; de virtute verborum."

Steinschneider (1906), 32, has already listed four of these MSS, but was mistaken in thinking Cotton Appendix VI, fols. 63v-70r, "Explicit Iacob alkindi de theoria planetarum," the same treatise as *The Theory of the Magic Art*.

the only objects which emit rays; everything in the world of the elements radiates force, too. Fire, color, and sound are examples of this. The science of physics considers the action of objects upon one another by contact, but the sages know of a more occult interaction of remote objects suggested by the power of the magnet and the reflection of an image in a mirror. All such emanations, however, are in the last analysis caused by the celestial harmony, which governs by necessity all the changes in this world. Thus the men of old, by experiments and by close scrutiny of the secrets of both superior and inferior nature and of the disposition of the sky, came to comprehend many hidden things in the world of nature and were able to discover the names of those who had committed theft and adultery.

Alkindi has thus prepared the reader's mind for the consideration of phenomena beyond the realm of ordinary physical action. At the same time he has approached the occult by arguing on the analogy of natural phenomena and he has laid down as a fundamental scientific premise what we now regard as a superstition of astrologers. In other words, he is not unaware of a difference in method and character between physics and astrology, between science and superstition, yet he tries to formulate a scientific basis for what is really a belief in magic.

Although Alkindi does not, as I recall, use the word magic, he next argues in favor of what is commonly called the magic power of words. He affirms that the human imagination can form concepts and then emit rays which will affect exterior objects just as would the thing itself whose image the mind has conceived. Muscular movement and speech are the two channels by which the mind's conceptions can be transformed into action. Frequent experiments have proven clearly the potency of words when uttered in exact accordance with imagination and intention, and when accompanied by due solemnity, firm faith, and strong desire. The effect produced by words and voices is heightened if they are uttered under favorable astrological conditions.

The border-line
between
science
and magic.

Magic
power
of words.

Some go best with Saturn, others with the planet Jupiter, some with one sign of the zodiac and others with another. The four elements are variously affected by different voices; some voices, for instance, affect fire most powerfully. Some especially stir trees or some one kind of tree. Thus by words motion is started, accelerated, or impeded; animal life is generated or destroyed; images are made to appear in mirrors; flames and lightnings are produced; and other feats and illusions are performed which seem marvelous to the mob.

Alkindi even ventures to touch upon the subject of prayer. He states that the rays emitted by the human mind and voice become the more efficacious in moving matter, if the speaker has fixed his mind upon and names God or some powerful angel. Human ignorance of the harmony of nature also often necessitates appeal to a higher power in order to attain good and to avoid evil. Faith, and observance of the proper time and place and attendant circumstances have their bearing, however, upon the success or failure of prayer as well as of other utterances. And there are some authorities who would exclude spiritual influence entirely in such matters and who believe that words and images and prayers as well as herbs and gems are completely under the universal control exercised by the stars.

The treatise concludes by discussing the virtues of figures, characters, images, and sacrifices in much the same way as it has treated of the power of words. We are assured that "The sages have proved by frequent experiments that figures and characters inscribed by the hand of man on various materials with intention and due solemnity of place and time and other circumstances have the effect of motion upon external objects." Every such figure emits rays having the peculiar virtue which has been impressed upon it by the stars and signs. There are characters which can be employed to cure disease or to induce it in men or animals. Images constructed in conformity with the con-

Problem
of prayer.

Figures,
characters,
and
sacrifice.

stellations emit rays having something of the virtue of the celestial harmony. Alkindi also defends the practice of animal sacrifice. Whether God or spirits are placated thereby or not, none the less the sacrifice is efficacious, if made with human intent and due solemnity and in accordance with the celestial harmony. The star and sign which are dominant when any voluntary act of this sort is begun, rule that work to its finish. The material and forms employed should be appropriate to the constellation, or the effect produced will be discordant and perverted.

It will have been noted that Alkindi more than once asserts that his conclusions have been demonstrated experimentally. Thus we have one more example of the connection, supposititious or real, between magic and experimental method.

The doctrine here set forth by Alkindi of the radiation of force and his explanation of magic by astrology were both to be very influential conceptions in Latin medieval learning. We shall find Roger Bacon, for example, repeating the same views in almost the same language concerning stellar rays and the power of words, and it is appropriate that in two manuscripts his utterances are placed together with those of Alkindi.¹

Alkindi's treatise *De somno et visione*, as we have it in the Latin translation by Gerard of Cremona,² accepts clairvoyance and divination by dreams as true and asks why we see some things before they happen, why we see other things which require interpretation before they reveal the future, and why at other times we foresee the contrary of what is to be.³ His answer is that the mind or soul has innate

¹ In Digby 91 Roger Bacon on Perspective is followed by Alkindi on the rays of the stars, while in Digby 183 a marginal note to Alkindi's treatise reads "Nota hoc quod est extractum de libro Rogeri Bakun de celo et mundo, capitulo de numero celorum," and following the work of Alkindi we have Bacon on the

retardation of old age and perhaps also *de radiis solaribus*.

² Edited by Nagy (1897). A MS of the late 12th or early 13th century which Nagy fails to note is Digby 40, fols. 15v-25, *de somno et visionibus*.

³ Nagy, p. 18, "Quare autem videamus quasdam res antequam sint? et quare videamus res cum

Experiment and magic.

Alkindi's medieval influence.

Divination by visions and dreams.

natural knowledge of these things, and that "it is itself the seat of all species sensible and rational." Vision is when the soul dismisses the senses and employs thought, and the formative or imaginative virtue of the mind is more active in sleep, the sensitive faculties when one is awake.

While by some persons, at least, opinions of Alkindi in his *Theory of the Magic Art* were regarded as erroneous, Albertus Magnus in his *Speculum astronomiae* listed among works on judicial astrology with which he thought that the church could find no fault "a book of Alchindi" which opened with the words *Rogatus fui*.¹ This is a work on weather prediction which still exists in a number of manuscripts² and was printed in 1507 at Venice, and in 1540 at Paris, together with a treatise on the same theme by Albumasar, of whom we shall say more presently.³

Weather prediction.

interpretatione significantes res
antequam sint? et quare videamus
res facientes nos videre contra-
rium earum?"

¹ Spec. astron. cap. 7. More fully the Incipit is, "Rogatus fui quod manifestem consilia philosophorum. . . ."

² Digby 68, 14th century, fols. 124-35. Liber Alkindii de impressionibus terre et aeris accidentibus. CU Clare College 15 (Kk. 4, 2), c. 1280, fols. 8-13, "In nomine dei et eius laude Epistola Alkindi de rebus aeribus et pluviosis cum sermone aggregato et utili de arabico in latinum translata."

Steinschneider (1906) 32 gives the title as *De impressionibus aeris*, and suggests that it is the same as a *De pluviosis* or *De nubibus*, which seems to be the case, as they have the same Incipit—Steinschneider (1905) 13—as does a *De imbribus* in Digby 176, 14th century, fols. 61-63. Steinschneider also suggested that BN 7332, *De impressionibus planetarum* was probably the same treatise; and this is shown to be true by the Explicit of Alkindi's treatise in another MS, Cotton Appendix VI, fol. 63v, "Explicit liber de impressionibus

planetarum secundum iacobum al-kindii." See also BN 7316, 7328, 7440, 7482.

The opening words of an anonymous *Tractatus de meteorologia* in Vienna 2385, 13th century, fols. 46-49, show that it is the Alkindi. A very similar treatise on weather prediction, *De subradiiis planetarum* or *De pluviosis*, is ascribed to Haly and exists in three Digby MSS (67, fol. 12v; 93, fol. 183v; 147, fol. 117v) and in some other MSS noted by Steinschneider. It belongs, I suspect, together with a brief *Haly de dispositione aeris* (Digby 92, fol. 5) which Steinschneider listed separately.

³ Some notion of the number of these astrological treatises on the weather may be had from the following group of them in a single MS.

Vienna 2436, 14th century,
fols. 134-6, "Finitur Hermanni
liber de ymbribus et pluviis"
136-8, Iohannes Hispalensis, *Trac-
tatus de mutatione aeris*
139, Haomar de pluviosis
139-40, Idem de qualitate aeris et
temporum
140, de pluvia, fulgure, tonitruis
et vento

Alkindi
as an
astrologer.

A majority, indeed, of the works by Alkindi extant in Latin translation are astrological.¹ Several were translated by Gerard of Cremona, and one or two by John of Spain and Robert of Chester.² Geomancies are attributed to Alkindi in manuscripts at Munich.³ Loth notes concerning Alkindi's astrology what we have already found to be the case in his theories of radiation and magic art and of divination by dreams; namely, that while he believes in astrology unconditionally, he tries to pursue it as a science in a scientific way, observing mathematical method and physical laws—as they seemed to him—while he attacked the vulgar superstitions which were popularly regarded as astrology.

Alkindi
on con-
junctions.

The astrological treatise by Alkindi, of which Loth edited the Arabic text, is a letter on the duration of the empire of the Arabs. This bit of political prediction was, as far as Loth knew, the first instance of the theory of conjunctions in Arabian astrology. The theory was that lesser conjunctions of the planets, which occur every twenty years, middling conjunctions which come every two hundred and forty years, and great conjunctions which occur only every nine hundred and sixty years, exert a great influence not only upon the world of nature but upon political and religious events, and, especially the great conjunctions, open new periods in history. Thus, as Loth says, the conjunction is for the macrocosmos what the horoscope is for man the microcosmos; the one forecasts the fate of

- 140-1, Doro^{ch}ius, *De hora pluvie et ventorum caloris et frigoris*
- 141, *Idem, De hora pluvie*
- 141-2, Alkindus, alias Doro^{ch}ius,
De aeris qualitatibus
- 142, *Idem, De imbris*
- 143, Jergis, *De pluviis*
- 198, 206, Iacobus Alkindus, *Liber de significationibus planetarum et eorum naturis, alias de pluviis.*"

¹ Their titles are listed by Steinschneider (1906) 99; 31-3. We may note BN 6978, 14th century, *Incipit epistola Alkindi*

Achalis de Baldac philosophi de futurorum scientia; *Corpus Christi* 254, fol. 191, "de aspectibus"—a fragment from a 14th century MSS.

² MSS of Robert's translation of Alkindi's *Judgments* are numerous in the Bodleian library: Digby 91, fol. 80-; Ashmole 179; 209; 369; 434; and extracts from it in other MSS. It opens, "Quamquam post Euclidem."

³ CLM 392, 15th century, fol. 80-; 489, 16th century, fols, 207-21.

the individual; the other, that of society. Loth knew of no Latin translation of Alkindi's letter, and medieval writers in Latin cite Albumasar usually as their authority on the subject of conjunctions. But Loth held that Albumasar, who was a pupil of Alkindi, merely developed and popularized the astrological theories of his master, and Loth showed that Albumasar embodied our letter on the duration of the Arabian empire in large part in his work *On Great Conjunctions* without mentioning Alkindi as his authority.

Although a believer in astrology to the point of magic, and not unacquainted with metals as his work *On the Properties of Swords* shows, Alkindi regarded the art of alchemy as a deception and the pretended transmutation of other metals into gold as false.¹ He affirmed this especially in his treatise entitled, *The Deceits of the Alchemists*, but also in his other writings.²

Something further should be said concerning the astrological treatises of Albumasar (Abu Ma'shar Ja'far ben Muhammad al-Balkhi) whence also his briefer appellations, Japhar and Dja'far. He died in 886 and has been called the most celebrated of all the ninth century Bagdad astrologers, although he has also been accused of plagiarism, as we have seen. In 1489 at Augsburg Erhard Ratdolt published three of his works, the *Greater Introduction to Astronomy* in eight books, the *Flowers*—which Roger Bacon cites as severely condemning physicians who do not study astrology³—and the eight books concerning great conjunctions and revolutions of the years. Of these the *Introduction* was translated both by John of Spain and Hermann of Dalmatia, but the former translation, although found in many manuscripts, remains unprinted. The *Flores* is found in numerous manuscripts and was reprinted in 1495. The

¹ O. Loth (1875), pp. 271-2; at 280-2 he gives the Latin of the passage in question from Albumasar, following the Arabic of Alkindi at 273-9.

Alkindi
and
alchemy.

Astrologi-
cal works
of Albu-
masar.

praktische Chemie, 1907, p. 73.
et seq.; cited by Lippmann (1919)

p. 399.

³ Bridges, *Opus Maius*, I, 262, note.

² E. Wiedemann in *Journal f.*

work on conjunctions and revolutions was printed again in 1515 and also exists in many manuscripts.¹ A French translation which Hagins the Jew, working for Henri Bate of Malines, made in 1273 of "Le livre des revolutions de siècle," of whose six chapters he translated only four,² probably applied to a part of this work.

Albertus Magnus in the *Speculum astronomiae*, in listing irreproachable works of astronomy and astrology, mentions a "Book of Experiments" by Albumasar instead of the Conjunctions and Revolutions along with his *Flowers* and *Introduction*.³ This book of experiments by Albumasar is often met with in the manuscripts. It is a different and shorter work than that in eight parts on Conjunctions, but itself

¹ Steinschneider (1905), p. 47.

² HL 21, 499-503.

³ *Spec. astron.* cap. 6. He gives the Incipit of the *Experiments* of Albumasar as "Scito horam introitum" which serves to identify it with the following:

Amplon. Quarto 365, 12th century, fols. 1-18, liber experimentorum.

Ashmole 369-V, 13th century, fols. 103-23v, ". . . incipit liber in revolutione annorum mundi. Perfectus est liber experimentorum . . ."

Ashmole 393, 15th century, fol. 95v, "Item Albumasar de revolutionibus annorum mundi sive de experimentis . . ."

BN 16204, 13th century, pp. 302-333, "Revolutio annorum mundi . . . Perfectus est liber experimentorum Albumasar . . ."

Arsenal 880, 15th century, fol. 1.

Arsenal 1036, 14th century, fol. 104v.

Dijon 1045, 15th century, fol. 81-.

Other MSS containing *Experiments* of Albumasar but where I am not sure of the wording of the Incipit are:

Laud. Misc. 594, 14-15th century, fol. 123-, Liber experimentorum.

Harleian 1, fols. 31-41, de experimentis in revolutione annorum mundi.

CLM 51, 1487, and 1503, Vienna 2436, 14th century, following John of Spain's translation of the *Introductorium magnum* at fols. 1-85 and a *Liber magnarum coniunctionum* at fols. 144-98, comes at fol. 242, "Liber experimentorum seu Capitula stellarum oblate regi magno Sarracenorum ab Albumasore." The Incipit here is "Dispositio est ut dicam ab ariete sic initium" but the treatise is incomplete.

In some MS at Oxford which I cannot now identify the *Flores* of Albumasar close with the statement that the book of Experiments will follow. A different hand then adds "The following work is Albumazar on the revolutions of years," while a third hand adds the explanation, "And according to some authorities it and the book of experiments are one," which is the case.

In some MSS, however, another treatise on revolutions accompanies the *Experiments*. In Amplon. Quarto 365 it is followed at fols. 18-27 by *Sentencie de revolutione annorum*, while in Laud. Misc. 594 it is preceded at fol. 106 by *Liber Albumasar de revolutionibus annorum collectus a floribus antiquorum philosophorum*, which is the same as the *Flores*.

deals with the subject of revolutions. It is not, however, to be confused with still another work by Albumasar on revolutions as connected with nativities.¹

Another work on astrology with which the name of Albumasar is connected is cited by medieval writers, notably Peter of Abano,² as *Albumasar in Sadan* (or *Sadam*), and is also found in Latin manuscripts where it is also called "Excerpts from the Secrets of Albumasar."³ Steinschneider regarded the Latin translation as a shortened or incomplete version of an Arabic original entitled *al-Mudsakaret*, or *Memorabilia* by Abu Sa'id Schâdsân, who wrote down the answers of his teacher to his questions.⁴ There is also a Greek text, entitled *Mysteries*, which differs considerably from the Latin and of which Sadan perhaps made use.⁵ The Latin version might be described as a miscellaneous collection of astrological teachings, anecdotes, and actual cases of Albumasar gathered up by his disciples and somewhat resembling Luther's *Table-Talk* in form.

We have already alluded to the treatise on weather prediction by Albumasar which was printed with a similar

*Albu-
masar in
Sadan.*

¹ The distinction between these various works is made quite clear in BN 16204, 13th century, where at pp. 1-183 is John of Spain's translation of the *Liber introductorius maior* in eight parts; at 183-302 the *Conjunctions*, also in eight parts; at 302-333 the *Revolutio annorum mundi* or *Liber experimentorum*; at 333-353 the *Flores*, and at 353-369 the *De revolutione annorum in revolutione nativitatum*, which opens "Omne tempus breve est operandi . . ." At the same time the Explicit of this treatise bears witness to the ease with which these works of Albumasar are confused, for it was at first written, "Explicit liber albumasar de revolutione annorum mundi," and some other hand has crossed out this last word and substituted "nativitatis."

² *Conciliator*, Diff. 156.

³ Laud. Misc. 594, 14-15th century, fols. 137-41, *Liber Sadan*, sive

Albumasar in Sadan. "Dixit Sadan, Audivi Albumayar dicentem quod omnis vita viventium post Deum est sol et luna / Explicit excerpta de secretis Albumasar."

Cat. cod. astrol. Graec. V, i, 142, quotes from a 15th century MS, "Explicit excerpta de secretis Albumasaris per Sadan discipulum cuius (eius?) et vocatur liber Albumasaris in Sadan."

The treatise, according to Steinschneider (1906), 36-8, is also found in *Amplon. Quarto* 352.

CLM 826, 14th century, written and illuminated in Bohemia, fols. 27-33, *Tractatus de nativitatibus*, "Dixit Zadan: audivi Albumazar dicentem . . ."

⁴ Steinschneider (1906), 36-38.

⁵ *Cat. cod. astrol. Graec.* V, i, 142. In Vienna MS 10583, 15th century, 99 fols., we find a "de revolutionibus nativitatum" by Albumasar "greco in latinum."

*Book of
rains.*

work by Alkindi in 1507 and 1540, and also often accompanies it in the manuscripts. In this "book of rains according to the Indians"¹ Albumasar is variously disguised under the names of Gaphar, Jafar, and Iafar and is called an Indian, Egyptian, or Babylonian.² In his Latin translation of it Hugo Sanctellensis tells his patron, the "antistes Michael" that the treatise was written by Gaphar, an ancient astrologer of India, and has since been abbreviated by a Tillemus or Cilenius or Cyleneus Mercurius.³ To Japhar is also attributed a *Minor Isagoga* to astronomy in seven lectures or *sermones*, which Adelard of Bath is said to have translated from the Arabic.⁴

We turn next to Costa ben Luca, or Qustá ibn Lūqá, of Baalbek, and especially to his treatise *On Physical Ligatures*, or more fully, *The Epistle concerning Incantations, Adjurations, and Suspensions from the Neck*. The scientific importance of Costa ben Luca may be seen from the circumstance that the *Mechanica* of Hero of Alexandria, of which the Greek text is for the most part lost, has been preserved in the Arabic translation which Costa prepared in 862-866

¹ BN 7316, 15th century, #13, liber imbrium secundos Indos . . . authore Jafar; so too BN 7329, 15th century, #6; BN 7316 #16, de mutatione temporum secundum Indos, seems, however, to be another anonymous treatise on the same subject. Perhaps the following, although not so listed in the catalogue, is by Albumasar.

Digby 194, fol. 147v- "Sapientes Indi de pluviis indicant secundum lunam, considerantes ipsius mansiones / quum dominus aspectus aspicit dominum vel est ei conjunctus."

² Corpus Christi 233, 13-15th century, fol. 122- "Japhar philosophi et astrologi Aegyptii. Cum multa et varia de nubium congregatione precepta Indorum traxit auctoritas . . ."

Cod. Cantab. Ii-I-13, "Incipit liber Gaphar de temporis mutatione qui dicitur Geazar Babiloniensis. Universa astronomiae

iudicia prout Indorum . . ."

³ The text printed in 1507 and 1540 is Hugo's translation. So is Bodleian 463 (Bernard 2456) 14th century, fols. 20r-24r, "Incipit liber imbrium editum a Iafar astrologo et a lenio et mercurio (Cilenio Mercurio) correc-to." See also Savile 15 (Bernard 6561), Liber imbrium ab antiquo Indorum astrologo nomine Jafar editus, deinde a Cyleneo Mercurio abbreviatus.

⁴ Digby 68, 14th century, fol. 116- "Ysagoga minor Japharis mathematici in astronomiam per Ad helardum Bathoniensem ex Arabico sumpta. Quicunque philosophie scienciam altiorem studio constanti inquireris . . ."

Sloane 2030, fols. 83-86v, according to Haskins in EHR (1913), but my notes, which it is now too late to verify, suggest that it is a fragment occupying less than a page at fol. 87.

Costa ben
Luca's
transla-
tion of
Hero's
Mechan-
ica.

for the caliph al-Musta. Several manuscripts of this Arabic text are still extant at Cairo, Constantinople, Leyden, and London, and it has been twice printed.¹

The work in which we are more especially interested has also been printed in editions of the works of Galen, of Constantinus Africanus, of Arnald of Villanova, and of Henry Cornelius Agrippa.² The treatise is also attributed to Rasis in the library at Montpellier.³ Its inclusion among Galen's works is a manifest error; in the edition of Agrippa it is appended as *The Letter of an Unknown Author (Epistola incerti authoris)*; while Arnald is represented as translating the work from Greek—a language of which he was ignorant—into Latin. He could read Arabic, however, and perhaps rendered the treatise from that language.⁴ But it had certainly been translated before his time, the end of the thirteenth century, and presumably by Constantinus Africanus, c1015-1087, since it not merely appears in his printed works but is found together with an imperfect copy of his *Pantegni* in a manuscript of the twelfth century.⁵ In a fifteenth century manuscript Unayn or Honein ben Ishak is named as the author of our treatise, but this seems to be a mistake.⁶ Albertus Magnus in the middle of the thirteenth century cites our treatise both in his *Vegetables and Plants*,⁷ where he alludes to "the books of incantations of Hermes the philosopher and of Costa ben Luca the philosopher, and the books of physical ligatures," and in his *Minerals*,⁸ where

¹ By Carra de Vaux in *Journal asiatique*, 9e série, I, 386, II, 152, 420, with a French translation; and by Nix, Leipzig, 1900, with a German translation, also printed separately in 1894.

² Galen, ed. Chart. X, 571; Constantinus Africanus, ed. Basel, 1536, pp. 317-21; Arnald of Villanova, *Opera*, Lyons, 1532, fol. 295, and also in other editions of his works; H. C. Agrippa, *Occult Philosophy*, Lyons, 1600, pp. 637-40.

³ HL XXVIII, 78-9.

⁴ *Idem*.

⁵ Additional 22719, 12th century,

fol. 200v, "Quesivisti fili karissime de incantatione adjuratione colli suspensione . . ." In view of this and the citations of the work by Albertus Magnus who wrote before Arnald of Villanova, I cannot agree with Steinschneider (1905), pp. 6 and 12, in denying that Constantinus translated the work and in ascribing the translation exclusively to Arnald.

⁶ Florence II, III, 214, 15th century, fols. 72-4, "Liber Unayn de incantatione. Quesisti fili karissime . . ."

⁷ *De vegetabilibus*, V, ii, 6.

⁸ *Mineral.* II, ii, 7, and II, iii, 6.

Latin versions of his *Epistle concerning Incantation, etc.*

the *Liber de ligaturis physicis*, as he calls it, is the source whence he has borrowed statements concerning gems ascribed to Aristotle and Dioscorides.

Form
of the
epistle.

Our treatise is in the form of a reply by Costa ben Luca to someone whom he addresses as "dearest son" and who has asked him what validity there is in incantations, adjurations, and suspensions from one's neck, and what the books of the Greeks and Indians have to say upon these matters. The wording of Costa's epistle varies considerably in the printed editions owing probably to careless interpretation of the manuscripts or careless copying by the earlier scribes, but its general tenor is the same.

Incanta-
tions
directly
affect
the mind
alone.

Costa first affirms that all the ancients have agreed that the virtue of the mind affects the state of the body. Galen in particular is cited as to the effect of passions upon health and the advisability of the physician's cheering the minds of gloomy patients even by resort to deception to a limited extent, if it seems necessary. A perfect mind generally goes with a perfect body and an imperfect mind with an imperfect body, as is seen in the case of children, old men, and women, or in the inhabitants of the intemperate zones, either torrid Ethiopia or the frozen north. Here one text specifies Scotland (*Scotie*); another, *Schytie*, which is perhaps intended for Scythia. Costa therefore argues that if anyone believes that an incantation will help him, he will at least be benefited by his own confidence. And if a person is constantly afraid that incantations may be directed against him, he may easily fret himself into a fever. This, Costa thinks, was what Socrates had in mind when he described incantations as "words deceiving rational souls by their interpretation or by the fear they produce or by despair." According to Albertus Magnus, who embodies a good deal of Costa's *Epistle* in his *Minerals*, Socrates said more fully that incantations, or perhaps better, enchantments, were made in four ways, namely, by suspending or binding on objects, by imprecations or adjurations, by characters, and by images; and that they dement rational souls so that they

fall into fear and despair or rise to joy and confidence; and that through these accidents of the mind bodies are altered either in the direction of health or of chronic infirmity.¹ Costa states that the medical men of India believe that incantations and adjurations are beneficial. But he says nothing to indicate that they, much less the Greeks or himself, have faith in the efficacy of incantations or words to work changes in matter *per se* or directly, nor does he say anything to indicate that demons may be summoned and given orders by this method. Perhaps his discussion of incantations is a trifle constrained and not sufficiently outspoken, but it is moderate and scientific and shows a fair degree of scepticism for that period, especially when we compare it with Alkindi's attitude towards the power of words.

Costa ben Luca's attitude towards sorcery seems the same as towards incantations. He concludes his discussion of this point by a story of "a certain great noble of our country" who had convinced himself that he had been bewitched and consequently became impotent. After vainly endeavoring to convince him that this was simply due to his imagination, Costa decided that there was nothing to do but humor him in his delusion. He therefore showed him a passage in *The Book of Cleopatra* which prescribed as an aphrodisiac the anointing of the entire body with the gall of a crow mixed with sesame.² The noble followed the prescription and had so much faith in it that his imaginary complaint disappeared.

Finally Costa considers the question of the validity of amulets, or ligatures and suspensions, which we have heard Socrates class with incantations, adjurations, characters, and images. Costa says that he has read in many works by the ancients that objects suspended from the neck are potent not through their natural, but their occult properties. He will not deny that this may be so, but is inclined as before

Men
imagine
them-
selves be-
witched.

How are
amulets
effective?

¹ *Mineral.* II, iii, 6 (ed. Borgnet, V, 55-6). word: it is *sizamelon* in one text, *sesameleon* in another.

² I am not certain as to this

to attribute the result rather to the comforting effect which such things have upon one's mind. He proceeds, however, to list a number of suspensions recommended by ancient writers.

First he cites from "Aristotle in the Book of Stones," a spurious treatise of which we shall have more to say in the chapter on Aristotle in the middle ages, a number of examples of the marvelous powers of gems worn suspended from the neck or set in a ring upon the finger. One augments the flow of saliva, another checks the flow of blood. The stone hyacinth enables its bearer to pass safely through a pestilent region, and makes him honored in men's thoughts and procures the granting of his petitions by rulers. The emerald wards off epilepsy, "wherefore we often prescribe to nobles that their children should wear this stone hung about the neck lest they incur this infirmity."

Costa also cites some recommendations of ligatures and suspensions from Galen, such as curing stomach-ache by suspending coral about the neck or abdomen, or the dung of wolves who have eaten bones, which should preferably be bound on with a thread made from the wool of a sheep eaten by that wolf. To Dioscorides are attributed such amulets as the teeth of a mad dog who has bit a man, which will safeguard their wearer from ever being so bitten—and it would be somewhat of a coincidence, if he were—and the seed of wild saffron which, held in the hand or worn about the neck, is good for the stings of scorpions. The Indians are cited for what is a recipe rather than an amulet: *stercum elephantinum cum melle mixtum et in vulva mulieris positum numquam permittit concipere.* And some say that a woman who spits thrice in a frog's mouth will not conceive for a year. A number of other examples are given without mention of any particular authority. Some of them, indeed, are very familiar and could be found in many authors, and we shall meet them in other contexts.

Costa concludes by saying that he himself has not tested these statements extracted from the works of the ancients,

Citations
from the
lapidary
of the
Pseudo-
Aristotle.

From
Galen and
Dioscor-
ides.

Occult
virtue.

but that neither will he deny them, since there exist in nature many strange phenomena and inexplicable forces. We would not believe that the magnet attracts iron, if we had not seen it. Similarly lead breaks adamant which iron cannot break. There is a stone which no furnace can consume and a fish which paralyzes the hand of the person catching it. These strange properties act in some subtle and mighty fashion which is not perceptible to our senses and which we cannot account for by reasoning.¹ But it is noteworthy that as in discussing incantations Costa said nothing of demons, so he fails to ascribe occult virtue to the influence of the stars.

Another treatise by Costa ben Luca, *On the Difference between Soul and Spirit*,² has little to do with occult science, but gives too good a glimpse of medieval notions in the field of physiological psychology to pass it by. It was translated into Latin by John of Spain for Archbishop Raymond of Toledo in the twelfth century,³ and is found in many manuscripts, often together with the works of Aristotle.⁴ Probably by a confusion of the names Costa ben Luca and Constantinus⁵ it was printed among the latter's works,⁶

¹ "Quorum enim actio ex proprietate est non rationibus, unde sic comprehendi non potest. Rationibus enim tantum comprehenduntur que sensibus subministrantur. Aliquando ergo quedam substantie habent proprietatem ratione incomprehensibilem propter sui subtilitatem et sensibus non subministratum propter altitudinem sui magnam." I doubt if these last three words refer to the influence of the stars.

² *Liber de differentia spiritus et animae*, or *De differentia inter animam et spiritum*. The prologue opens: "Interrogasti me—honoret te Deus!—de differentia . . ."

³ Steinschneider (1866), p. 404; (1905), p. 43, "wovon ich das Original in Gotha 1158 erkannte."

⁴ So in *Corpus Christi* 114, late 13th century, fol. 229, and at Paris in the following MSS of the 13th

or 14th century mostly: BN 6319, #11; 6322, #11; 6323, #6; 6323A; 6325, #17; 6567A; 6569; 8247; 16082; 16083; 16088; 16142; 16490.

⁵ Specific illustrations of such confusions between the two names in the MSS are: BN 6296, 14th century, #15, ". . . authore filio Lucae Medici Constabolo"; Brussels, Library of Dukes of Burgundy 2784, 12th century, "Constaben"; Sloane 2454, late 13th century, "Liber differentiae inter animam et spiritum quem Constantinus Luce amico suo scriptori Regis edidit."

⁶ Constantinus Africanus, *Opera*, Basel, 1536, pp. 307-17, "Qui voluerit scire differentiam, que est inter duas res . . . / . . . Hec igitur de differentiis spiritus et anime tibi dicta sufficient, valet." Edited more recently by S Barach, Innsbruck, 1878, pp. 120-39.

*On the
Difference
between
Soul and
Spirit.*

and indeed we find very similar views in his *Pantegni*¹ and in his treatise *On Melancholy*. The work has also been ascribed to Augustine,² Isaac,³ Avicenna,⁴ Alexander Neckam, Thomas of Cantimpré, and Albertus Magnus.⁵ A different work with a similar title and somewhat similar contents is the *De spiritu et anima*, which is printed with the works of Augustine⁶ but which cites such later authors as Boethius, Isidore, Bede, Alcuin, St. Bernard, and Hugh of St. Victor, to whom also it has been attributed.⁷ Thomas Aquinas called it the work of an anonymous Cistercian.⁸ But to return to our treatise.

Costa ben Luca has, as we have hinted, some diverting passages in the fields of physiological psychology. He believes in the existence of *spiritus*, which is not spirit in one of our senses of that word, but "a subtle body," unlike the soul which is incorporeal. This subtle *spiritus* perishes when separated from the body and it operates most of the vital processes of the body such as breathing and the pulse, sensation and movement. The two former processes are operated by *spiritus* "arising from the heart and borne in the pulsating veins to vivify the body." The two latter processes are caused by *spiritus* which arises from the brain and operates through the nerves. Thus *spiritus* is the cause of life in the body and it leaves this mortal frame with our dying gasp. The clearer and more subtle this *spiritus* is, the more readily it lends itself to mental processes, while the more perfect the human body, the more perfect the *spiritus* and the human mind. Hence the intellectual powers of children and women are inferior, and the same is true of races subjected to excessive heat or cold like the Ethiopians or Slays.

¹ *Theorica*, III, 12.

² *Corpus Christi* 154, late 13th century, pp. 356-74, ascribed to Augustine in both *Titulus* and *Explicit*.

³ S. Marco 179, 14th century, fols. 57-9, 83, *Liber Ysaac de differentia spiritus et animae*.

⁴ CU Gonville and Caius 109, 13th century, fols. 1-6v, "Avicenna

de differencia spiritus et anime."

⁵ So says Coxe, *anent Corpus Christi* 114, and Steinschneider (1905), p. 43.

⁶ Migne, PL 40, 779-832.

⁷ By Trithemius; but earlier so cited by Vincent of Beauvais (PL 40, 779-80). See also Exon.

⁸ 23, 13th century, fol. 196v.

⁸ Migne, PL 40, 779-80.

Here we have the same views repeated as in the *Epistle concerning Incantation*. Some physicians and philosophers think that there are two vessels in the heart and that there is more *spiritus* than blood in the left hand vessel and more blood than *spiritus* in the right hand vessel. The *spiritus* in the brain becomes more subtle and apt to receive the virtues of the soul by its passage from one cavity of the brain to another. The less subtle *spiritus* the brain uses for the five senses; Costa speaks of "hollow nerves" from the brain to the eye through which the *spiritus* passes for the purpose of vision. The most subtle *spiritus* is employed in the higher mental processes such as imagination, memory, and reason.

Costa ben Luca gives an amusing explanation of how these processes take place in the brain. The opening between the anterior and posterior ventricles of the brain is closed by a sort of valve which he describes as "a particle of the body of the brain similar to a worm." When a man is in the act of recalling something to memory, this valve opens and the *spiritus* passes from the anterior to the posterior cavity. Moreover, the speed with which this valve works or responds differs in different brains, and this fact explains why some men are of slow memory and why others answer a question so much sooner. The habit of inclining the head when deep in cogitation is also to be explained as tending to open this valve. However, the relative subtlety of the *spiritus* is another important factor in intellectual ability.

Other medieval writers differed somewhat from these views of Costa ben Luca as to the nature of *spiritus* and the cavities of the brain. For instance, Constantinus Africanus in his treatise *On Melancholy* states that the *spiritus* of the brain is called the rational soul, which is inconsistent with the distinction drawn between soul and spirit in the other treatise. In the eleventh century both Constantinus in his *Pantegni* and *Anatomy* or *De humana*

Thought explained physiologically.

Views of other medieval writers.

natura,¹ and Petrocellus the Salernitan in his *Practica*;² in the twelfth century both Hildegard of Bingen³ and the Pseudo-Augustinian *Liber de spiritu et anima*;⁴ in the thirteenth century both Bartholomew of England, who seems to cite Johannitius (Hunain ibn Ishak) on this point,⁵ and Vincent of Beauvais agree that the brain has three main cavities. The first is phantastic, from which the senses are controlled, where the sensations are registered, and where the process of imagination goes on. The middle cell is logical or rational, and there the forms received from the senses and imagination are examined and judged. The third cell retains such forms as pass this examination and so is the seat of memory.⁶ The Pseudo-Augustine, however, represents it further as the source of motor activity. Constantinus and Vincent of Beauvais, who quotes him in the thirteenth century, further distinguish the phantastic cavity as hot and dry, the logical cell as cold and moist, and the seat of memory as cold and dry. Moreover, the phantastic cell which multiplies forms contains a great deal of *spiritus* and very little medulla, while the cell of memory which retains the smaller number of forms selected by reason contains much medulla and little *spiritus*. Thus the general point of view of these other authors resembles that of Costa ben Luca despite the divergence from him in details. They perhaps also owe something to Augustine, who in his genuine works speaks of the three cells of the brain but makes the

¹ Both passages were excerpted by Vincent of Beauvais, *Speculum naturale*, XXIX, 41.

² De Renzi (1852-9) IV, 189; Petrocellus is very brief on the cells of the brain.

³ Singer (1917), pp. 45 and 51, has noted that Hildegard's description of the brain as divided into three chambers is antecedent by the *Liber de humana natura* of Constantinus, and contained "in the writings of St. Augustine."

⁴ PL 40, 795, cap. 22.

⁵ *De proprietatibus rerum*, III, 10 and 16; V, 3.

⁶ Similarly E. G. Browne (1921), p. 123, writing of Arabian medicine and Avicenna, says, "Corresponding with the five external senses, taste, touch, hearing, smelling, and seeing, are the five internal senses, of which the first and second, the compound sense (or 'sensus communis') and the imagination, are located in the anterior ventricle of the brain; the third and fourth, the co-ordinating and emotional faculties, in the mid-brain; and the fifth, the memory, in the hind-brain." Galen had somewhat similar ideas.

hind-brain the center of motor activity, and the mid-brain the seat of memory.¹

Thabit ibn Kurrah ibn Marwan ibn Karaya ibn Ibrahim ibn Marinos ibn Salamanos (Abu Al Hasan) Al Harrani or Thabit ben Corrah ben Zahrūn el Harrani, or Tabit ibn Qorrah ibn Merwan, Abu'l-Hasan, el-Harrani, or Thabit ben Qorrah or Thabit ibn Qurra, or Tabit ibn Korrah, or Thabit ben Korra, as he is variously designated by modern scholars;² or Thebit ben Corat, or Thebith ben Corath, or Thebit filius Core, or Thebites filius Chori, also Tabith, Tebith, Thabit, Thebeth, Thebyth, and Benchorac, ben corach, etc., as we find it in the medieval Latin versions—Thebit ben Corat seems the prevalent medieval spelling and so will be adopted here—was born at Harran in Mesopotamia about 836, spent much of his life at Bagdad, and lived until about 901.³ He wrote in Arabic as well as Syriac, but was not a Mohammedan, and Roger Bacon alludes to him as “the supreme philosopher among all Christians, who has added in many respects, speculative as well as practical, to the work of Ptolemy.”⁴ As a matter of fact, he was a heathen or pagan, a member of the sect of Sabians, whose chief seat was at his birth-place, Harran.

The Sabians appear to have continued the paganism and astrology of Babylonia, but also to have accepted the Agathodaemon and Hermes of Egypt,⁵ and to have had relations with Gnosticism and Neo-Platonism. They seem to have laid especial stress upon the spirits of the planets,⁶ to whom they made prayers, sacrifices, and suffumigations,⁷ while days on which the planets reached their culminating-

Thebit
ben
Corat.

The
Sabians.

¹ *De Genesi ad litteram*, VII, 18 (PL 34, 364).

² The fullest treatment of him will be found in D. A. Chwolson, *Die Ssabier und der Ssabismus*, Petrograd, 1856, 2 vols., *passim*. For a list of his works see Stein-schneider, *Zeitschrift f. Math.*, XVIII, 331-38.

³ There is some difficulty with these dates or their Arabic equivalents, because we are not cer-

tain whether the length of his life is given in lunar or solar years: see Chwolson, I, 532-3, 547-8.

⁴ Bridges, I, 394.

⁵ Carra de Vaux, *Avicenne*, Paris, 1900, p. 68.

⁶ Chwolson, II, 406, 422, 431, 440, 453, 610, 703.

⁷ *Ibid.*, I, 741; II, 7, 258, 386, 677, etc.

points were celebrated as festivals.¹ They observed the houses and stations of the planets, their risings and settings, conjunctions and oppositions, and rule over certain hours of the day and night.² Some planets were masculine, others feminine; some lucky, others unlucky;³ they were related to different metals;⁴ the different members of the human body were placed under different signs of the zodiac;⁵ and in general each planet had its own appropriate figures and forms, and ruled over certain climates, regions, and things⁶ in nature. Most of this, however, is astrological commonplace whether of pagans, Mohammedans, or Christians. Nor were the Sabians peculiar in associating intellectual substances or spirits with the planets.⁷ It was only in worshiping these and denying the existence of one God and in their practice of sacrificial divination that they could be distinguished as heathen or pagan. However, they seem to have devoted a rather unusual amount of attention to astrology and other forms of magic such as oracular heads,⁸ magic knots and figures,⁹ and seal-rings carved with peculiar animal figures. These last they often buried with the dead for a time in order to increase their virtue.¹⁰

Thebit's
relations
to Sabi-
anism.

Thebit, at any rate, seems to have prided himself upon being a descendant of pagan antiquity. In a passage praising his native town he said, "We are the heirs and posterity of heathenism,"¹¹ and he described with veneration a ruined Greek temple at Antioch.¹² He had, however, some religious disagreement with the Sabians of Harran and was finally forced to leave.¹³ He met a philosopher who took him to Bagdad where he became one of the Caliph's astronomers¹⁴ and founded there a Sabian community to his own taste.

¹ Chwolson, II, 386-97, 500, 525, 530, 676.

² *Ibid.*, I, 737.

³ *Ibid.*, II, 30, 373.

⁴ *Ibid.*, II, 411, 658, 839.

⁵ *Ibid.*, II, 253.

⁶ *Ibid.*, I, 738.

⁷ *Ibid.*, I, 733-4.

⁸ *Ibid.*, II, 19, 148, 150.

⁹ *Ibid.*, II, 21, 138-9.

¹⁰ *Ibid.*, I, 526; II, 141.

¹¹ Quoted by Bishop Gregory Bar-hebraeus in his *Syrian Chronicle*: Chwolson, I, 177-80.

¹² Chwolson, I, 195; II, 623.

¹³ *Ibid.*, I, 482-3.

¹⁴ Again there seems to be uncertainty as to dates, since the Arabic sources name a caliph who was not contemporary with the philosopher in question: Chwolson, I, 548-9.

His numerous religious writings show the value which he attached to various Sabian usages and rites: ceremonials at burials, hours of prayer, rules of purity and impurity and concerning the animals to be sacrificed, readings in honor of the different planets.¹

Thebit was a writer of encyclopedic range and translated from the Greek² into Arabic or Syriac such authors as Apollonius, Archimedes, Aristotle, Euclid, Hippocrates, and Galen. He "was famed above all as a philosopher,"³ but most of his philosophical works are lost, but some geometrical treatises by him are extant, and a work on weights appears in Latin translation.⁴ A group of four astronomical treatises by him also occurs with fair frequency in medieval manuscripts.⁵ On the basis of these specimens of his astronomy Delambre was not moved to assign him any great place in the history of the science;⁶ Chwolson objects that they are too brief to do him justice,⁷ but they are probably the cream of his own contributions to the subject or the middle ages would not have translated and preserved them so sedulously.

Whatever Thebit's contributions to positive knowledge may or may not have been, there is no dispute as to the fact that he was given to occult science and even superstition. His attitude towards alchemy, indeed, is doubtful, as a work of alchemy is ascribed to him in one manuscript of

¹ Chwolson, I, 485. Chwolson perhaps lays himself open a little to the charge of arguing in a circle, since Thebit's writings are his main source concerning Sabianism.

² *Ibid.*, I, 553-64, for a list of his translations of, extracts from, and commentaries upon Greek works.

³ *Ibid.*, I, 484.

⁴ BN 10260, 16th century, "Incipit liber Karastoni de ponderibus . . . / . . . editus a Thebit filio Core." Also in BN 7377^B, 14-15th century, #3; 7424, 14th century, #6; Vienna 5203, 15th century, fols. 172-80. For other MSS see Björnbo (1911) 140.

Thebit as encyclopedist, philosopher, astronomer.

His occult science.

⁵ Harleian 13, fol. 118- Thebit de motu octave spere; fol. 120v- Liber Thebiti ben Corath de his qui indigent expositione antequam legitur Almagestum; 123- Liber Thebit de ymaginatione spere et circulorum eius diversorum; 124v- Liber Thebiti de quantitatibus stellarum et planetarum.

Also in Harl. 3647, #11-14; Tanner 192, 14th century, fol. 103-; BN 7195, 14th century, #12-15; Magliabech. XI-117, 14th century; CUL 1767 (Ii. III, 3) 1276 A. D., fols. 86-96; and many other MSS.

⁶ Delambre (1819) 73.

⁷ Chwolson, I, 551.

the fourteenth century and some notes against the art in another.¹ But of his adhesion to astrology there is no doubt,² and Chwolson notes his interest in the mystic power of letters and magic combinations of them.³ But the one outstanding example of his occult science is his treatise on images, which seems to have been a favorite with the Latin middle ages, since it appears to have been translated into Latin twice, by Adelard of Bath⁴ and by John of Seville,⁵

¹ BN 6514, #10, *Thebit de alchymia*; Amplon. Quarto 312, written before 1323 A. D., fol. 29, *Notule Thebith contra alchimiam*.

² A work on judgments is ascribed to him in a Munich MS, CLM 588, 14th century, fol. 189-*Thebites de iudiciis*; followed by, 220-*Liber iudicialis Ptolomei*, 233-*Libellus de iudiciis*, and 238-*Modus iudicandi*. The treatise on fifteen stars, fifteen herbs, and fifteen stones, which as we have seen is usually ascribed to Hermes or Enoch, is attributed to Thebit in at least one MS, BN 7337, page 129.

³ I, 551.

⁴ Lyons 328, fols. 70-74, *Liber prestigiorum Thebidis* (Elbidis) secundum Ptolemeum et Hermetem per Adhelardum bathonensem translatus, opening, "Quicunque geometria atque philosophia peritus astronomiae expers fuerit ociosus est." In this MS the treatise closes with the words, "ut prestigiorum artifex facultate non decidat." This seems to be the only MS known where the translation is ascribed to Adelard of Bath. It seems to have once been part of Avranches 235, 12th century, where the same title is listed in the table of contents. Haskins, in EHR (1911) 495, fails to identify the work, calling it "a treatise on horoscopes." It is to be noted, however, that Albertus Magnus in listing bad necromantic books on images in the *Speculum astronomiae* (cap. xi, Borgnet, X, 641) gives the same Incipit for a *liber praestigiorum* by Hermes, "Qui geometriae aut philosophiae peritus, expers astro-

nomiae fuerit . . ." Undoubtedly the two were the same.

⁵ Of John of Seville's translation the MSS are more numerous. The following will serve as a representative. Royal 12-C-XVIII, 14th century, fols. 10v-12r, "Dixit thebith bencorat et dixit aristoteles qui philosophiam et geometriam exercet et omnem scientiam legit et ab astronomia vacuus fuerit erit occupatus et vacuus quod dignior geometria et altior philosophia est ymaginum scientia. / Explicit tractatus de imaginibus Thebith Bencorath translatus a Iohanne Hypsalensi atque Limensi in Limia ex Arabicō in Latinum. Sit laus deo maximo."

This is the version cited by Michael Scot in his *Liber Introductorius* (Bodleian 266, fol. 200) where he gives the Incipit, "Dixerunt enim thebith bencorath et aristoteles quod si quis philosophiam . . .," etc., substantially as above.

But now comes a good joke on Albertus, who has listed among good astronomical books of images (*Speculum astronomiae*, cap. xi, Borgnet, p. 642) the work of "Thebith eben chorath" opening "Dixit A. qui philosophiam . . ." which of course is that just mentioned. Thus he condemns one translation of the same book and approves the other; is he perhaps having some fun at the expense of the opponents of both astrology and necromancy?

It will be noted that it is Aristotle, rather than Hermes or Ptolemy, who is cited at the start in John of Seville's translation. I

since the manuscripts of it are numerous,¹ and it also was printed,² and since Thebit is cited as an authority on the subject of images by such medieval writers as Roger Bacon, Albertus Magnus,³ the author of *Picatrix*,⁴ Peter of Abano,⁵ and Cecco d'Ascoli.⁶

The work begins by emphasizing the need of a knowledge of astronomy in order to perform feats of magic (*praestigia*). The images described are astronomical or astrological and must be constructed under prescribed constellations in order to fulfill the end sought. Often, however, they are human forms rather than astronomical figures. It is not necessary to engrave them upon gems; Thebit expressly states that the material of which they are made or

therefore am uncertain whether Chwolson has our treatise in mind, when he speaks of Thebit's commenting upon "eine pseudopermetische Schrift über Talismane u.s.w." In the printed text of 1559 Aristotle and Ptolemy are cited in the first paragraph, but in the MSS Aristotle is cited twice.

¹ Some other MSS differ slightly from the foregoing in their opening words, but perhaps not enough to suggest a third translation:

Ashmole 346, 16th century, fols. 113-15v, "Incipit liber de ymaginibus secundum Thebit. In nomine pii et misericordis Dei. Dixit Thebit qui geometrie aut philosophiae expers fuerit."

Bodleian 463 (Bernard 2456), written in Spain, 14th century, fols. 75r-75v, "Dixit thebit benecorat Ar. qui legit phylosophiam et geometriam et omnem scientiam et alienus fuerit ab astronomia erit impeditus vel occupatus."

The following MSS ascribe the translation to John of Spain and have the usual opening words, "Dixit Thebit ben Corat, Dixit Aristoteles, qui philosophiam, etc."

Digby 194, 15th century, fol. 145v-.

S. Marco XI-102, 14th century, fols. 150-53.

Berlin 963, 15th century, fol.

140- "Dixit thebit ben corach Cum volueris operari de ymaginibus," but then at fol. 199, with the usual Incipit.

Harleian 80 has the first part missing but ends, fol. 76r, like John's translation.

Still other MSS are:

Harleian 3647, 13th century.

Sloane 3846, fols. 86v-93; 3847; and 3883, fols. 87-93: all three 17th century.

Amplon. Quarto 174, 14th century, fols. 120-1.

BN 7282, 15th century, #4, interprete Joanne Hispalensi.

Berlin 964, 15th century, fols. 213-5.

Vienna 2378, 14th century, fols. 41-63.

CLM 27, 14-15th century, fols. 71-77; 59, 15th century, fols. 239-43.

Florence II-iii-214, 15th century, fols. 1-4, "Incipit liber Thebit Benchorac de scientia omigarum et imaginum. (D) ixit Aristotiles qui."

² *De tribus imaginibus magicis*, Frankfurt, 1559.

³ *Mineral.* II, iii, 3.

⁴ Magliabech. XX-20, fol. 12r; Sloane 1305, fol. 19r.

⁵ *Conciliator*, Diff. X., fol. 16GH, in ed. Venice, 1526.

⁶ *Commentary on the Sphere*, cap. 3.

Astrological
and
magic
images.

upon which they are engraved is unimportant, and that lead or tin or bronze or gold or silver or wax or mud or anything you please will do. The essential thing and "the perfection of mastery" is careful conformity to astrological conditions. This science of images is indeed, as Aristotle and Ptolemy have testified, the acme of astrology. Nevertheless, after the image has been properly constructed, there is usually some non-astrological ceremony to be executed in connection with it which savors of magic. Often the image is to be buried, not however in a grave as in the case of the ancient curses upon lead tablets, but in the house of someone concerned. Once two images are to be placed facing each other and wrapped in a clean cloth before burying them. Instructions are also given as to the direction in which the person burying the image should face. Also forms of words are prescribed which are to be repeated as the image is buried. Once the name of the person whom it is desired to injure is to be written with "names of hate on the back of the image." Among the objects supposed to be achieved by such images are driving off scorpions, destroying a given region, causing misfortunes to happen to others, recovery of stolen objects, success in business or politics, protection from possible injury at the hands of the king, or the causing of an enemy's death by bringing him into disfavor with the monarch. The treatise closes, at least in the printed text, with an admission of its essentially magic character by saying, "And this is what God the highest wished to reveal to his servants concerning magic, that His name may be honored and praised and ever exalted through the ages." But no mention is made of demons, unless an instruction to name one image "by a famous name" alludes to some spirit.

We shall now conclude the present survey with some account of Rasis and his writings, with the exception of a number of books of experiments ascribed to him, but which it is impossible to separate from those ascribed to Galen

and other authors, and of which we shall treat later under the head of such experimental literature.

The full name of Rasis or Rhazes was Abu Bakr Muhammad ibn Zakariya ar-Razi,¹ the last word indicating his birthplace in Persia. The date of his birth is uncertain, perhaps about 850. He died in 923 or 924.² For the facts of his life we are dependent upon two Arabic writers of the thirteenth century³ who do little except tell one "good" story after another about him, or quote his famous sayings, most of which sound as if culled from the works of Galen. When about thirty years of age Rasis came to Bagdad and is said to have been attracted to the study of medicine by hearing how an inflamed and swollen forearm which gave great pain was marvelously cured by the application of an herb, which came to be called "the vivifier of the world." In the early years of the tenth century Rasis served as physician in the hospital at Bagdad. According to Withington he has been called "the first and most original of the great Moslem physicians." He also was interested in philosophy and alchemy, as his writings will show.

There has come down to us a list of some 232 works ascribed to Rasis.⁴ Some of them are probably merely different wordings of the same title, others are very likely chapters repeated from his longer works, but at any rate they serve to give us some idea of his interests and the

¹ Also given as Muhammad ibn Zakariya (Abu Bakr) ar-Razi and Abu Bekr Mohammed ben Zachariah.

² Withington in his *Medical History*, 1894, gives the date as 932, perhaps by a misprint.

³ Ibn Abi Usaibi'a (1203-1269, himself a physician and son of an oculist) "Sources of Information concerning Classes of Physicians," compiled at Damascus, 1245-1246, ed. by Müller, Cairo, 1882; and Ibn Khallikan (1211-1282), "Obituaries of Men of Note," written between 1256 and 1274.

For these titles and most of

the general account of the life and works of Rasis which follows I am indebted to G. S. A. Ranking's "The Life and Works of Rhazes," pp. 237-68, in *Transactions of the Seventeenth International Congress of Medicine, Section XXIII*, London, 1913.

⁴ The list is reproduced by Ranking (1913) in Arabic and Latin, largely on the basis of a MS at the University of Glasgow, which contains a Latin translation by a Greek priest, who died in 1720, of the Arabic work of Usaibi'a, or part of it, mentioned in the previous note: Hunterian Library, MS 44, fols. 1-19v.

Life of Rasis.

ground he covered, although of course some may be incorrectly attributed to him. Editions of the Latin translations of some of his chief medical works were printed before the end of the fifteenth century at Milan in 1481 and Bergamo in 1497.¹ These contain the famous *Liber Almansoris* or *Liber El-Mansuri dictus* with its ten subordinate treatises: (1) introduction to medicine and discussion of human anatomy, (2) the doctrine of temperaments and humors and a discussion of the art of physiognomy,² with a chapter on how to select slaves, (3) diet and drugs, (4) hygiene, (5) cosmetics, (6) rules of health and medicines for travelers, (7) surgery or "the art of binding up broken bones and concerning wounds and ulcers," (8) poisons, (9) treatment of diseases from head to foot, (10) fevers. Following this in both editions come his works on Divisions, on diseases of the joints, on the diseases of children, and his Aphorisms or six books of medicinal secrets. Other writings by Rasis found in one or both of the printed editions are a brief treatise on Surgery, Cautery, and Leeches,³ the book of Synonyms, the table of antidotes, and some others which we shall have occasion to mention later. His treatise on the pestilence or on smallpox and measles was printed many times from the fifteenth to sixteenth century.

In the list of 232 titles are three works which all seem to bear on the same point and are perhaps different descriptions of one treatise, or else show that this was a favorite theme with Rasis. The idea in all three seems to be that no physician is perfect or can cure all diseases of all patients,

¹I have examined both these editions at the British Museum; Withington does not mention them in his *History of Medicine*, but cites editions of the *Continentis*, Venice, 1542, and *Opera Parva*, 1510, and a modern edition (1858) by the Sydenham Society of *On the Small Pox and Measles*. The pages are not numbered in the edition of 1481, so that I shall not be able to give exact references to them.

²This was sometimes repro-

duced separately: see Wolfenbüttel 2885, 15th century, fol. 1, *Phisonomia Rasis*, fol. 2, *Phisonomia Aristotelis*, *Rasis et Philomenis, summorum magistrorum in philosophia*.

³It occupies but a little over three pages in the 1481 edition. Since in the middle of the treatise we read "Magister rasis fecit cauterizari quidem artheticum . . .", etc., it is perhaps by a disciple rather than Rasis himself.

that this is why many persons go to charlatans, and why sometimes quacks, old-wives, and popular practice succeed in certain cases where the most learned doctors have failed.¹

Other titles show that Rasis was interested in natural science and not merely in the practice of medicine. Besides what would appear to have been a general treatise entitled, *Opinions concerning Natural Things*, he wrote on optics, holding that vision was not by rays sent forth from the eye, and discussing some of the figures in the work on optics ascribed to Euclid. In a letter he inquired into the reason for the creation of wild beasts and venomous reptiles; and in a third treatise wrote of the magnet's attraction for iron and of vacuums.² His interest in natural philosophy of a rather theoretical sort is indicated by an *Explanation of the book of Plutarch or commentary on the book of Timaeus*.³ Other titles attest his experimental tendency.⁴

Eight titles deal with alchemy⁵ and show that Rasis regarded transmutation as possible. One is a reply to Alkindi who held the opposite opinion.⁶ None of these writings seem to be extant in Arabic, however, and the Latin works of alchemy ascribed to Rasis are generally regarded as spurious. The thirteenth century encyclopedist, Vincent

His
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¹79, *Dissertatio de causis quae plororumque hominum animos a praestantissimis ad viliores quosque medicos solent deflectere.*

¹²⁴, *Liber, Quod medicus acutus non sit ille qui possit omnes curare morbos quoniam hoc non est in hominum potestate . . .*

¹²⁵, *Epistola, Quod artifex omnibus numeris absolutus in quamcumque arte non existat nedum in medicina speciatim: et de causa cur imperiti medici, vulgus, et etiam mulieres in civitatis, foeliiores sint in sanandis quibusdam morbis quam viri doctissimi et de excusatione medici hoc propter.*

There appears to be a German translation by Steinschneider of this work by Rasis on the success of quacks and charlatans in *Virchow's Archiv f. Pathologische Anatomie*, XXXVI, 570-86.

²Ranking (1913), #180, 15, 138, 163.

³*Ibid.*, #137; also 145, *Supplementum libris Plutarchi*.

⁴*Ibid.* #126, *Liber, De probatis et experientia compertis in arte medica; per modum syntagmatis est digestus.* #205, *Liber, Quod in morbis qui determinari atque explicari non possunt oporteat ut medicus sit assiduus apud aegrotantem et debeat uti experimentis ad illos cognoscendos. Et de medici fluctuatione.*

⁵*Ibid.* #25, 26, 32-35, 38, 40. I should guess that 201, *Arcanum arcanorum de sapientia*, was the same as 35, *Arcanum arcanorum*.

⁶*Ibid.* #40, *Responsio ad philosophum el-Kendi eo quod artem al-Chymi in impossibili posuerit.*

of Beauvais, made a number of citations from the treatise *De salibus et aluminibus* attributed to Rasis, but Berthelot¹ regarded this work as later than Rasis and it is not found among our eight titles. The *Lumen luminis*, which is ascribed to Rasis² and seems to have been translated by Michael Scot³ in the early thirteenth century, is also mainly devoted to these two substances, salts and alums. A *Book of Seventy* is ascribed to Rasis as well as to Geber. Berthelot was inclined to think that a *Book of Secrets* perhaps went back to Rasis. At least some good stories are told by Arabic chroniclers of Rasis' connection with alchemy. One is to the effect that he abandoned the art as a result of a sound beating to which the caliph subjected him when he failed to transmute metals at order. Another states that in preparing the elixir he injured his eyes with its vapors and was cured by a physician who charged him a fee of five hundred *dinars*. Rasis paid the doctor's bill, but, remarking that at last he had discovered the true alchemy and the best art of making gold, devoted the remainder of his life to the study and practice of medicine.⁴

Titles suggestive of astrology and magic.

Rasis also wrote treatises on mathematics and the stars but it is not always easy to infer their contents from the titles which have alone reached us or to tell when *mathematica* means astrology. In one work he seems to have shown the excellence and utility of *mathematica*, but to have confuted those who extolled it beyond measure.⁵ In a letter he denied that the rising and setting of the sun and other planets was because of the earth's motion and held that it was due to the movement of the celestial orb.⁶ In another letter he discussed the opinion of natural philosophers concerning the sciences of the stars and whether or

¹ Berthelot (1893), I, 68 and 286-7. On the alchemy of Rasis see further in this same volume the chapter, *L'Alchimie de Rasis et du Pseudo-Aristote*.

² BN 6514 and 7156.

³ Riccardian 119, fol. 35v, "Incipit liber luminis luminum trans-

latus a magistro michaеле scotto philosopho." Printed by J. Wood Brown (1897), p. 240 *et seq.*

⁴ Lippmann (1919), p. 400, citing the *Biographies* of Albaihaqi (1105-1169).

⁵ Ranking, #8.

⁶ *Ibid.* #107.

not the stars were living beings.¹ Rasis also discussed the difference between dreams from which the future can be forecast and other dreams.² The title, *Of exorcisms, fascinations, and incantations*, under which, according to Negri's Latin translation Rasis discussed the causes and cures of diseases by these methods and magic arts, should, in Ranking's opinion, be more accurately translated as *The Book of Divisions and Branches*.³ A work *On the Necessity of Prayer* is also included in the list of 232 works ascribed to Rasis,⁴ while a Lapidary produced for Wenzel II of Bohemia (1278-1305) cites Rasis *On the virtues of words and characters*.⁵

Herewith we conclude our present survey of Arabian occult science especially in the ninth century, although in the following chapters we shall frequently encounter its influence. We have found the occult science closely associated with natural science and difficult to sever from it. In the authors and works reviewed we have found both scepticism and superstition, both rationalism and empiricism. But perhaps the most impressive point is that even superstition pretends to be or attempts to be scientific.

Conclusion.

¹ Ranking, #134. Other titles in mathematics and astronomy are: 73, *Liber de sphaeris et mensuris compendiosis*; 128, *De septem planetis et de sapientia*; 155, *De quadrato in mathesi epistola*; also 109 and 110.

² *Ibid.* #13.
³ *Ibid.* #51.
⁴ *Ibid.* #158, *De necessitate pre-cationis*.

⁵ Printed as the Lapidary of Aristotle, Merseburg, 1473, p. 2.